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भाग 19 विद्युत-यांत्रिकीय कार्य

Indian Standard

METHOD OF MEASUREMENT OF WORKS IN RIVER VALLEY PROJECTS (DAMS AND APPURTENANT STRUCTURES)

PART 19 ELECTRO-MECHANICAL WORKS

ICS 93.160

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BUREAU OF INDIAN STANDARDS
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NEW DELHI 110002

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Measurement and Cost Analysis of Works for River Valley Projects Sectional Committee, WRD 23

FOREWORD

This Indian Standard (Part 19) was adopted by the Bureau of Indian Standards, after the draft finalized by the Measurement and Cost Analysis of Works for River Valley Projects Sectional Committee had been approved by the Water Resources Division Council.

In the measurement of quantities, in the construction of river valley projects, a large diversity of methods exists at present according to local practices. Lack of uniformity creates complication regarding measurement and payments. This standard is intended to provide a uniform basis for measurement of various items of electrical works carried out in river valley projects.

This standard is a part of the series of Indian Standards formulated on the method of measurement of works in river valley projects (Dams and appurtenant structures). The other parts in the series are as given below:

Part 1	Excavation for foundation
Part 2	Dewatering
Part 3	Grouting
Part 4	Concrete works
Part 5	Masonry
Part 6	Ventilation pipes and other embedded materials
Part 7	Joints
Part 8	Instrumentation
Part 9	Lining
Part 10	Form work
Part 11	Diaphragm walls
Part 12	Topographical surveys
Part 13	Earth and fill dams
Part 14	Canal works
Part 15	Investigation works Section 1 Drilling of bore Section 2 Exploratory drifting and logging
Part 16	Tunneling
Part 17	Hydromechanical and related metal works
Part 18	Sheet piling

For the purpose of deciding whether a particular requirement of this standard is complied with, the final value, observed or calculated expressing the result of a test or analysis, should be rounded off in accordance with IS 2 : 1960 ‘Rules for rounding off numerical values (*revised*)’. The number of significant places retained in the rounded off value should be the same as that of the specified value in this standard.

Indian Standard

METHOD OF MEASUREMENT OF WORKS IN RIVER VALLEY PROJECTS (DAMS AND APPURTENANT STRUCTURES)

PART 19 ELECTRO-MECHANICAL WORKS

1 SCOPE

This standard (Part 19) covers the methods for the measurement of electromechanical works in terms of units of measurement for the works carried out in river valley projects.

2 GENERAL

Electromechanical works in river valley projects can be categorized into 42 items as given below. The units of measurement of each works alongwith site adjustment/extra measurement have been mentioned against each item:

Sl No.	*Equipment*	*Measurement Unit*	*Site Adjustment/Extra Measurement*
1.	Turbine and governor	In lot per unit (set of turbine, its accessories and governor)	—
2.	Main inlet valve	In lot per MIV (Including auxiliary system of MIV)	—
3.	Generator, excitation and AVR	In lot per unit comprising of: a) Stator assembly; b) Rotor assembly; c) Excitation and AVR equipment namely, excitation transformer, voltage regulator, rectifier, etc; and d) Other equipments including bearings and auxiliaries.	—
4.	Bus duct	In lot per unit which include bus conductors, support structures, insulating material, enclosures for bus duct, joints and taps, measuring instruments such as CT, PT and protective instruments such as surge arrestors, neutral grounding transformers, grounding resistors and cooling systems, etc	Length of main and tap bus conductors with enclosure, in metre, and support structures by weight for site adjustment
5.	Generator step-up transformers	Number of transformers installed along with assembly of various auxiliaries at site	—
6.	XLPE or oil filled HV cables	In lot per cable or per unit	The support structure by weight and the length of cable, in metre, for site adjustment
7.	HV switch gear (GIS, etc)	In lot with respect to each bay comprising of circuit breakers, isolators, earthing switches, CTs, PTs, and bus, etc	The support structure by weight and the bus duct of each type, in metre, for site adjustment

Sl No.	*Equipment*	*Measurement Unit*	*Site Adjustment/Extra Measurement*
8.	Potyard/Switchyard	a) Fabrication, galvanizing, supply and erection of main galvanizing steel structures, mounting galvanized steel structure for various switch gear, galvanized embedded foundation parts and galvanized MS flats for earthing of structures/equipment, etc, by weight	Unit rates/measurement for site adjustment
		b) Lot per set of each type of switching equipment comprising of CVT, line traps, surge arrestors, insulators and switching equipment not covered in the switchgear system	—
9.	DC battery system	a) Lot per battery system b) Lot per charger c) Lot per DCDB	—
10.	Control and monitoring system	Lot per section/unit, as applicable	—
11.	Protection system	Lot per section/unit, as applicable	—
12.	Power and control cables including cable trays	a) Fabrication and erection of supporting structures in respect of quantity measured by weight	—
		b) Erection of cable trays of each size on walls, column, ceiling, cable tunnel, etc, including painting, etc, in respect of length, in metre	
		c) Cable laying and glanding including cable accessories, in metre (each type)	—
		d) Termination of each type of cables in respect of size and cores in per set	—
13.	11 kV switch gear	Lot per section/panel of each type	—
14.	DG sets including step-up transformers	Lot per DG set of each type comprising of: a) Diesel engine, b) 415V, 3-ϕ Alternator, c) 0.415/11kV Step-up transformer, d) Instrumentation and control panel, and e) Auxiliary equipment.	—
15.	Auxiliary and station transformer, 415V switchgear	Lot per transformer of each type	—
		Lot per section/panel of each type comprising of control and protective equipments including distribution in the 415V switchgear system	

Sl No.	*Equipment*	*Measurement Unit*	*Site Adjustment/Extra Measurement*
16.	PLCC equipment	Lot per set as per given below: a) Outdoor; 1) Line traps along with coupler, etc	Unit measurement of each equipment of outdoor and indoor installations
		b) Indoor; 1) Carrier cabinet; and 2) Telephone sets	—
17.	Illumination system	a) In number in respect of following: 1) Distribution board of each type, 2) Sub-distribution board of each type, 3) Fittings of luminaries of each type, and 4) Poles with foundation of each type.	—
		b) In metre of, 1) Conduit work of each size and cross section (including accessories); and 2) Wiring and cabling of each size and different cores (including accessories).	
18.	Public address system	Lot for set of loudspeakers, microphones and distribution panels including wiring, etc	Length of wiring and conduiting including accessories, in metre, for site adjustment
19.	Optical fibre cable link between dam and powerhouse	Length of cables, in metre including termination, etc	—
20.	Electrical workshop	Lot per item of each type of electrical equipment required	—
21.	EOT cranes for power house	No. of cranes installed and commissioned	—
22.	Cooling water system	Lot per system	Unit charges for pumps, valves, filters, strainers of each type for site adjustment fire dampers, etc, in m^2
23.	Grounding system	Weight of earthing material used	—
24.	Fire fighting system	Lot per system	a) Unit price of each type of the equipment of fire fighting and detection, etc b) No. of pumps, valves of each type for site adjustment c) Pipes of each size including fittings by metre d) Unit measurement of fire extinguishers of each type e) Cable, etc, as per Sl No.12

Sl No.	*Equipment*	*Measurement Unit*	*Site Adjustment/Extra Measurement*
25.	HP compressed air system	Lot per system	a) Unit measurement of each type of compressor b) No. of valves of each type for site adjustment c) Pipes of each size including fittings by metre
26.	LP compressed air system	Lot per system	a) Unit measurement of each type of compressor b) No. of valves of each type for site adjustment c) Pipes of each size including fittings by metre
27.	Oil filtration plant	Lot per system for purification of transformer oil and bearing oil	a) No. of valves of each type for site adjustment b) Pipes of each size including fittings by metre
28.	Workshop equipment	Lot per item of each type of equipment	—
29.	Elevators	Lot per lift including motors, control panel, etc	—
30.	Ventilation of tunnels through exhaust blowers and pipe	Per hour of operation of exhaust blowers	Length of ventilation pipe to be considered
31.	Air conditioning: a) Equipment during operation b) Equipment during installation	 Per hour of effective air conditioning at a particular temperature Lot per item of each type of equipment	—
32.	Instrumentation (for seismological quality control lab, water level recorder, meteorological, etc	Lot per item of each type of equipment	—
33.	Control room equipment and instruments	Lot per item of each type of equipment	—
34.	Water level recorder equipment	Lot per item of each type of equipment	—
35.	Telemetry for transmission of hydraulic data	Lot per item of each type of equipment	—
36.	Computerization of the project	Lot per item of each type of equipment	—
37.	Maintenance during operation stage	Lot per item of each type of equipment	—

Sl No.	*Equipment*	*Measurement Unit*	*Site Adjustment/Extra Measurement*
38.	Transformers of switchyard	Lot per item of each type of equipment	—
39.	H.T and L.T electrical supply system	Lot per item of each type of equipment/ sub station/line	—
40.	Warning system	Lot per item of each type of equipment	—
41.	Cable gallery	Running meter of each size of cable.	—

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Amendments Issued Since Publication

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